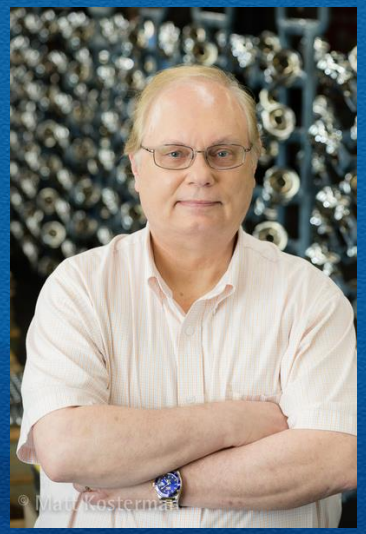
ICC Beneficial Electrification

Electric Vehicle Education + Overcoming Barriers to Adoption

February 9, 2022



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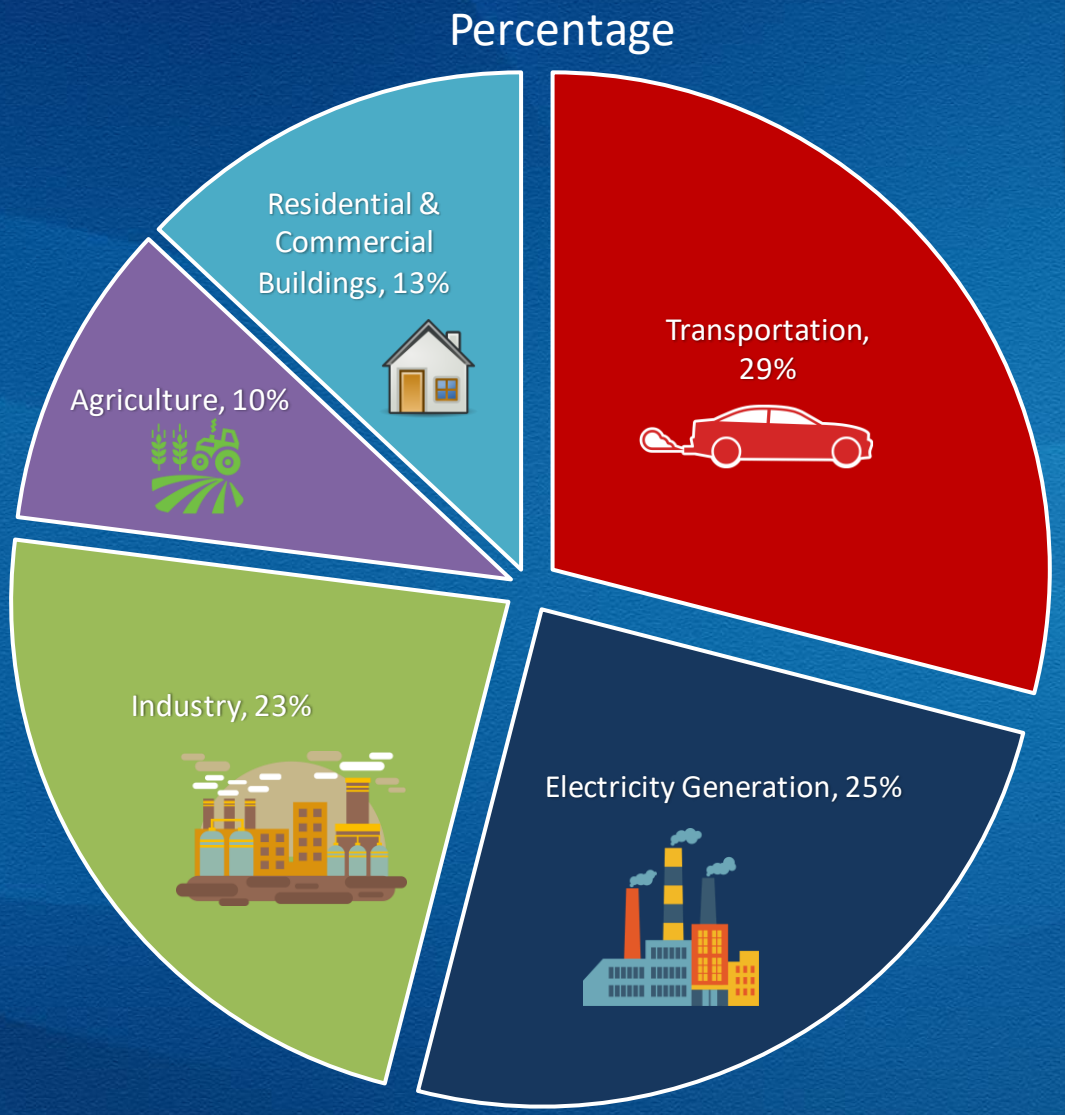
Version 2

Agenda

- Greenhouse Gas Emissions & Pollution
- EV Availability & Styles
- EV Common Beliefs
- EV Total Cost of Ownership (TCO)
- Summary

Greenhouse Gas Emissions Priorities



1. Transportation – 29% emissions
2. Electricity generation – 25% emissions
3. Industry – 23% emissions
4. Agriculture/forestry/land - 10% emissions
5. Buildings – 13% emissions

Actions for Transportation (29%)

1 gallon of gas emits almost 20 lbs CO_2 plus CO…

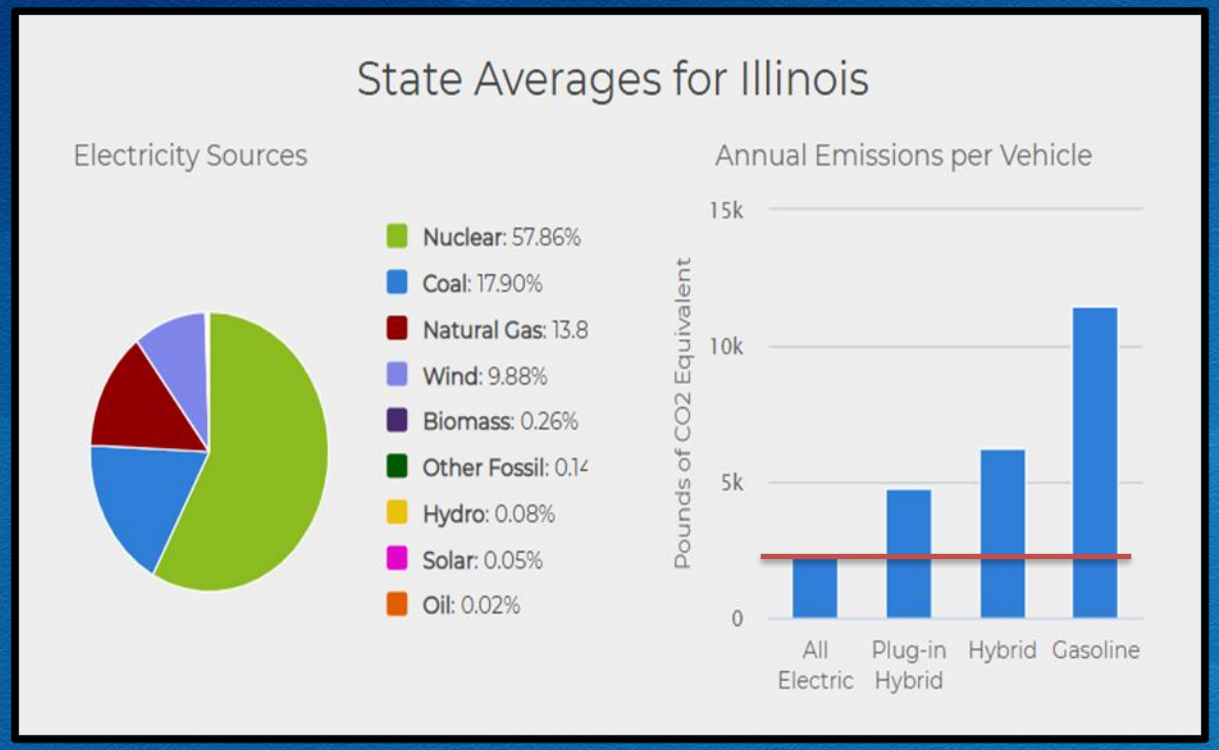
From: Internal Combustion Engine Vehicles (ICE)

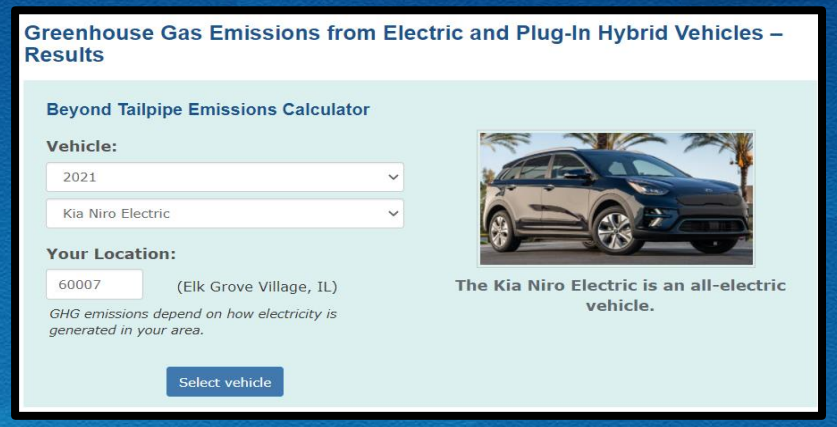
To: Zero Emissions Vehicles (Cars, pick-ups, SUV, buses, etc.)

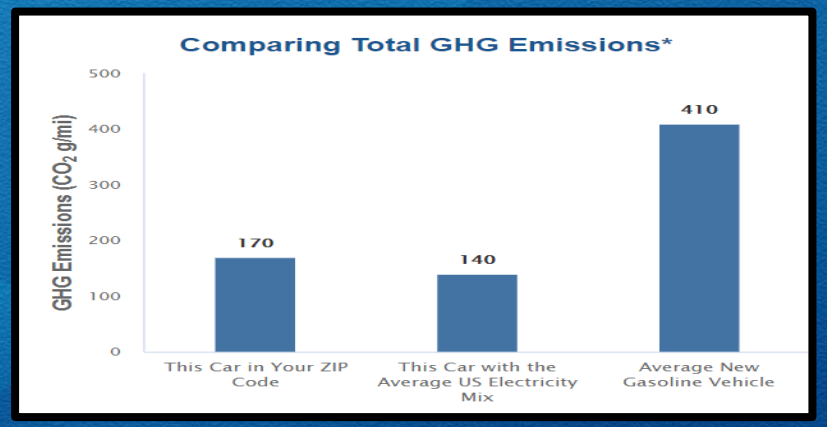
Other:

- Use Public Transportation
- Strong CAFE Standards (272M/1.4B ICE Vehicles)
- More Computerized Traffic Control Systems
- Drive Less – Work from Home, Teleconferencing
- More Walking and Biking

Greenhouse Gas Emissions

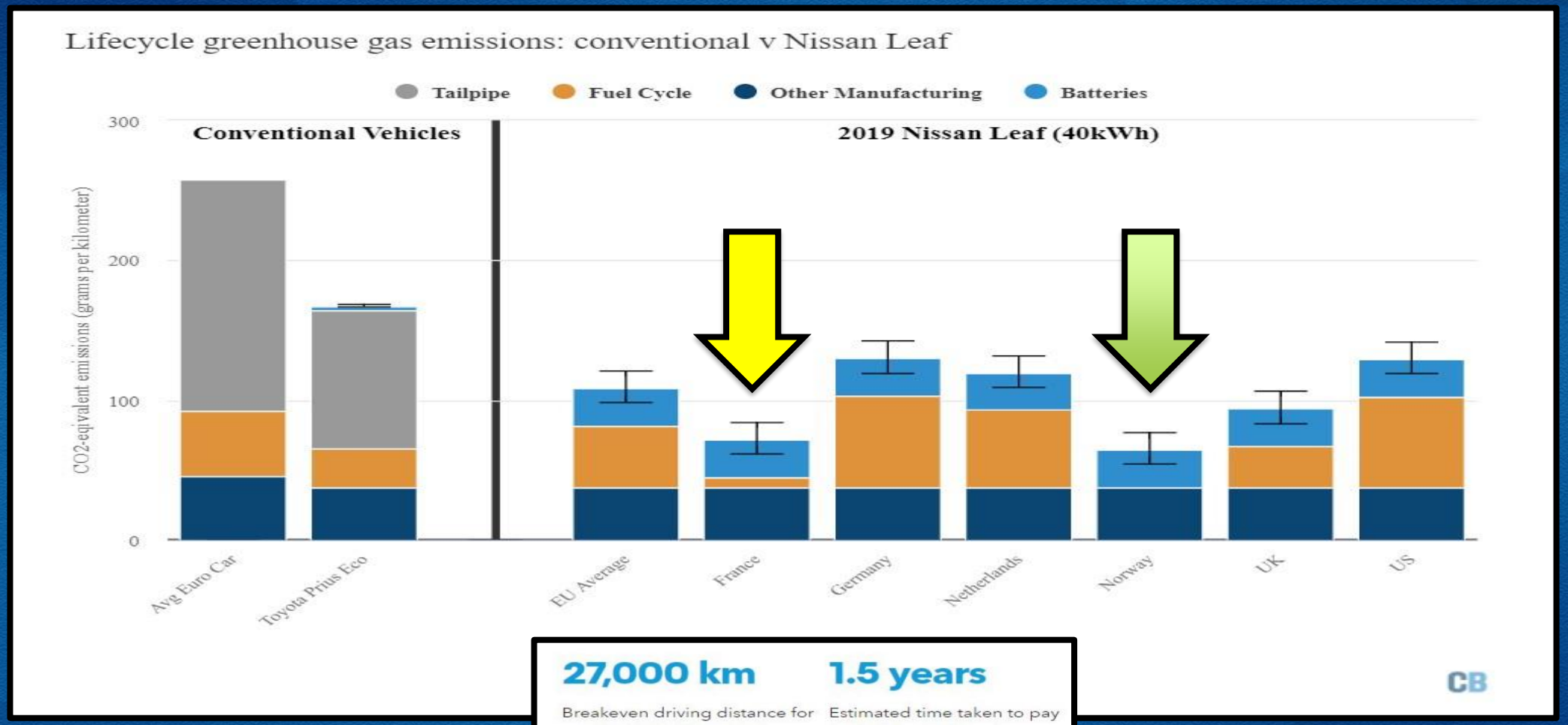






Source: Oak Ridge National Laboratory for the U.S. Department of Energy and the U.S. Environmental Protection Agency - www.fueleconomy.gov

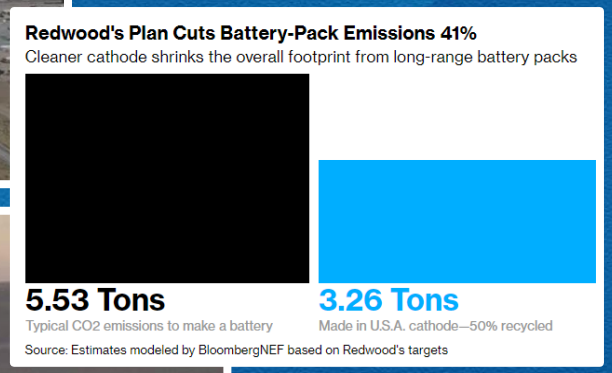
What About Battery Manufacturing?



16,777 Miles

CarbonBrief
CLEAR ON CLIMATE

Redwood Materials (J.B. Straubel) Carson City, NV – 3.8B Valuation



Poisonous Pollution

- 9 million people die each year due to pollution (Lancet).
- 41% of US residents (135M) live in areas that do not meet health stds. (EPA).
- Vehicles are 75% of carbon monoxide pollution (EPA)
- Chicago: failing grade on air quality

Not all EVs are Expensive

Chevy Bolt EV - $31,995 (259 mi.)

Chevy Bolt EUV – $33,995 (249 mi.)

Tesla Model 3 - $44,900+ (267+ mi.)

Kia Niro EV - $39,990 (239 mi.)

Hyundai Ioniq EV - $33,245 (170 mi.)

VW ID.4 - $39,995+ (240+ mi.)

Nissan Leaf - $27,400+ (149+ mi.)

Hyundai Kona EV - $34,000 (258 mi.)

Ford Mustang Mach-E – $43,895+ (270+ mi.)

STYLE


Ford F-150 Lightening $39,974


GMC Hummer EV
1,000 HP
0 – 60 in 3 seconds


2022 Rivian R1T - $67,600 (Summer)

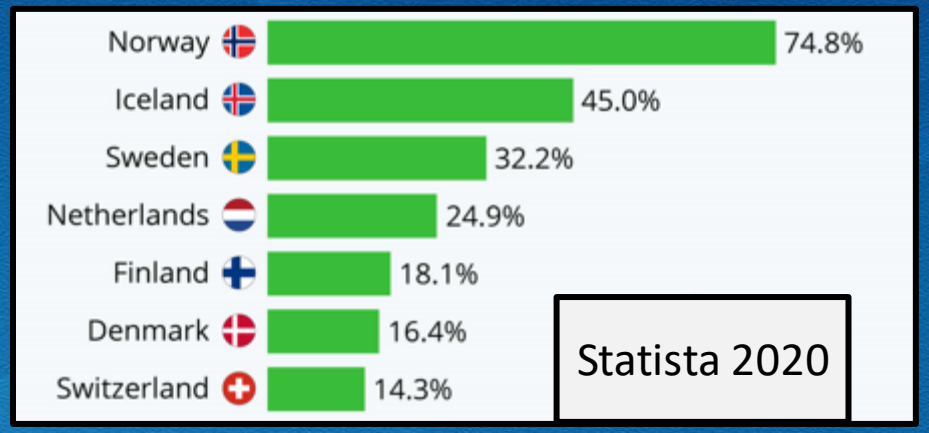
2022 Hyundai Ioniq 5 SUV

- $43,650 MSRP / $36,150 tax cred
- 303-miles of battery range
- 225 HP (258 lb./ft. torque)
- 0 to 60 MPH in 5.2 seconds
- 2 years free public charging
- Public charging to 80% - 18m+

Source: Hyundai USA

2021 EV-Related Incorrect Beliefs

- Many people are afraid of EVs in cold weather
- **54%** of people do not believe you can charge at home on a regular A/C outlet* **FALSE!**



- **70%** of people believe you need special charging equipment at home to charge an EV* **OFTEN FALSE!**
- **55%** of people do not know there are tax credits from the federal government to buy an EV*

* Colorado Energy Office 2021

Fueling Paradigm Shift: Current State to Future State

[1]Statistica [2]DOT [3]Argonne National Labs [4]DOT, J.D. Powers, Plug-in-America

Fueling Paradigm Shift: Current State to Future State

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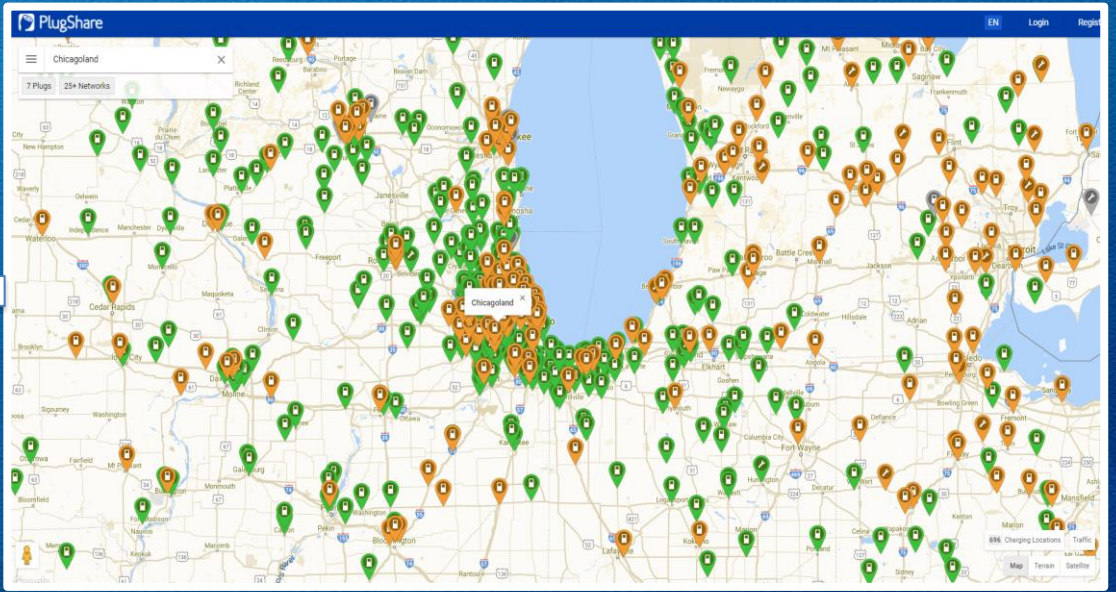


Total Cost of Ownership – Maintenance @ 50%

Maintenance Schedule for your 2017 Chevrolet Bolt EV — $4,150

Certified Service	7,500 miles	15,000 miles	22,500 miles	30,000 miles	37,500 miles	45,000 miles	52,500 miles	60,000 miles	67,500 miles	75,000 miles	82,500 miles	90,000 miles	97,500 miles	105,000 miles	112,500 miles	120,000 miles	127,500 miles	135,000 miles	142,500 miles	150,000 miles
Rotate tires, if recommended for the vehicle, and perform Required Services.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Replace passenger compartment air filter (or 2 years, whichever comes first).			✓			✓			✓			✓			✓			✓		
Drain and fill vehicle coolant circuits.																				✓

Maintenance Schedule for your 2016 Chevrolet Cruze Limited — $8,350

Certified Service	7,500 miles	15,000 miles	22,500 miles	30,000 miles	37,500 miles	45,000 miles	52,500 miles	60,000 miles	67,500 miles	75,000 miles	82,500 miles	90,000 miles	97,500 miles	105,000 miles	112,500 miles	120,000 miles	127,500 miles	135,000 miles	142,500 miles	150,000 miles
Rotate tires, if recommended for the vehicle, and perform Required Services. Check engine oil level and oil life percentage. Change engine oil and filter, if needed.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Replace passenger compartment air filter (or 2 years, whichever comes first).			✓			✓			✓			✓			✓			✓		
Replace engine air cleaner filter (or every 4 years, whichever occurs first).						✓						✓						✓		
Replace spark plugs and inspect spark plug wires.													✓							
Replace spark plugs. Inspect ignition coils boots. (Applies to: 1.4 L)								✓								✓				
1.8L Engine Only: Replace timing belt, idler pulley, and timing belt tensioner (or every 3 years, whichever comes first). (Applies to: 1.8 L)													✓							
Change automatic transmission fluid, if equipped. If filter is serviceable, change filter. (Applies to: Severe)						✓						✓						✓		
Change manual transmission fluid. (Applies to: Manual, Severe)						✓						✓						✓		
Drain and fill engine cooling system (or every 5 years, whichever comes first).																				✓
Change brake fluid (or every 3 years, whichever occurs first).						✓						✓						✓		
Change clutch fluid (or every 3 years, whichever occurs first). (Applies to: Manual)						✓						✓						✓		
Inspect evaporative control system.						✓						✓						✓		
Inspect engine accessory drive belts for fraying, excessive cracks or obvious damage (or every 10 years, whichever occurs first).																				✓

Source: Consumer Reports

EV	SERVICE	COST
NO	Lube and Oil Filter	$64.95
NO	Replace Transmission Fluid	$175.00
NO	Radiator Coolant Service	$159.95
UNL	Front Brake Pad Replace	$199.99
UNL	Rear Brake Service	$199.99
NO	Fuel Filter Replace	$149.99
NO	Tune-up/spark plugs	$150.00+
NO	Replace Engine Air Filter	$50.00
NO	Replace Timing Belt	$612.00
YES	Windshield Wiper Blades	$29.95
YES	12-volt Battery Check	$14.99
YES	Tire Rotation	$9.95
YES	Tire Wheel Balance	$109.95
YES	Passenger Cabin Filter	$59.95
YES	Wheel Alignment	$129.95

Total Cost of Ownership - Fueling

Measurements	Average ICE Car	Average EV****	EV Cost Savings
Miles Driven Per Year*	14,263	14,263	-
Cost For Fuel - Gas or Electricity**	$ 3.56	$ 0.12	-
Miles Per Gallon or kWh***	25.40	4.00	-
Annual usage - Gallons or /kWh	561.54	3,565.75	-
Cost Per Mile	$ 0.1401	$ 0.0300	$ 0.11
Cost for 1-year	$ 1,997.94	$ 427.89	$ 1,570.05
Costs for 8-years (Owner Avg.)	$ 15,983.54	$ 3,423.12	$ 12,560.42
Costs for 12-years (Lifetime Avg.)	$ 23,975.32	$ 5,134.68	$ 18,840.64
* Federal Highway Admin.			
** U.S. Bureau of Labor Statistics 2021			
*** EPA 2020			
**** Hyundai Kona EV			

Clean Transportation Basics – Cost Example

Hyundai Kona EV

- **Purchase Cost**
  - Purchase = $34,000 (MSRP)
  - Tax Credit = $7,500 (Feds) + …
  - **Effective Purchase Cost = $26,500**
  - --
- **Operating Cost Savings***
  - 8-year fuel cost savings = $12,560 ($0.11 per mi.)
  - 8-year maintenance cost savings = $2,760 ($345 per yr.)
  - **8-year total cost avoidance = $15,320 ($1,915 per yr. - $159/mo.)**

* Annual Miles = 14,263 , Avg. use = 8-years / ICE 25.4 MPG @ $3.56/gallon (Jan 2022 in Illinois) / EV = year-round avg. = .25 kWh/mi. @ $0.12 kWh

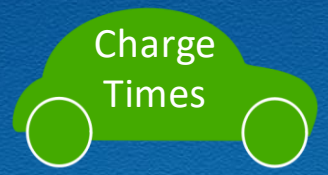
Avg range 250 mi

Avg driver 39 mi

Charging @ home

Easy Public Via app

8-Seconds



20 - 45 Min DCFC

Bat 8 yr/100K mi

Plus Std Warranty

200+ HP

Instant. Torque

$3K-$8K More

$7.5K Tax Credit

$1,500+ Less Yr

$0.11 per mi Less

Free or $1,200

$30% Tax Credit

None

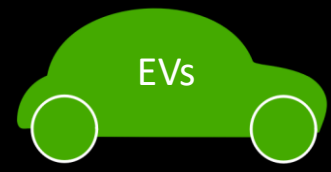
Avoid Sick/Deaths

ZEV (Green Grid)
(e.g., Norway)

75% Avoided (Mix)

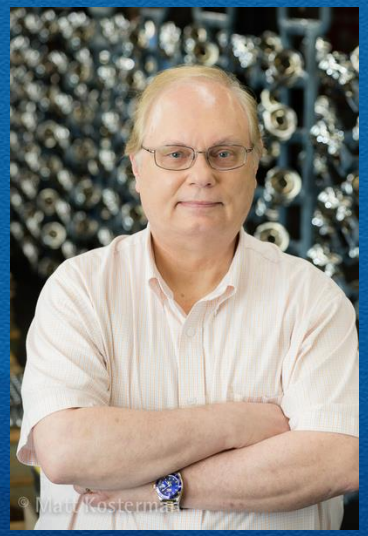
- Automakers are all-in
- Need more public EVSE
- Need Apt/condo EVSE

EV are Better



Vehicles

Thank you!



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Version 5